

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Koichiro Tanaka	Art Unit :	2822
Serial No. :	09/842,797	Examiner :	Maria F. Guerrero
Filed :	April 27, 2001	Conf. No. :	7383
Title :	METHOD OF FABRICATING SEMICONDUCTOR DEVICE		

Mail Stop Appeal Brief - Patents

Commissioner for Patents

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REPLY BRIEF

Pursuant to 37 C.F.R. § 41.41, Applicant responds to the Examiner's Answer as follows:

At paragraph (1) of the response to argument, the Examiner again asserts (in response to appellant's arguments that none of the references describes or suggests forming two crystalline regions using the same laser beam) that the claims do not require the laser beam to have the same wavelength, and that Yamazaki shows forming two crystalline regions using the same laser beam with different pulse durations at Figs. 4B-4E; col. 4, lines 65-68; col. 5, lines 1-5; and col. 6, lines 1-10. Appellant again disagrees that Yamazaki shows forming two crystalline regions using the same laser beam with different pulse durations at the noted passages or elsewhere. First, col. 4, lines 65-68, describes the use of an excimer laser in laser annealing:

“As an example, in the first laser annealing step, a relatively shallow region 5 to 100 nm deep from the surface is crystallized, using an excimer laser irradiation which penetrates shallowly the semiconductor material such as silicon.”

Col. 5, lines 1-5 describe a second laser annealing step that uses a YAG laser, which is a different type of laser and, as such, necessarily would not provide the same laser beam as is used in the first laser annealing step:

“In a second laser annealing step, a YAG laser irradiation which penetrates relatively deeply the semiconductor material is used to crystallize it up to a relatively deep portion 50 to 1000 nm deep from the surface. In this way, a semiconductor region which has a shape required by the invention and a large mobility can be formed.”

Col. 6, lines 1-10 describes the use of a continuous-wave argon laser beam in the second laser annealing step of a different example from the one described by col. 4, lines 65-68, and col. 5, lines 1-5:

“The laminate was laser annealed by irradiation of a continuous-wave argon ion laser beam having a power density of 1 to 1000 kW/cm², e.g., 20 kW/cm². With the gate electrode as a mask, regions 502b including the source and drain regions were changed into polycrystals. At this time, the depth of the region 502b was 200 to 500 nm. The depth of the region could be varied slightly by controlling the number of the pulses of the laser and the output.”

Prior to forming the region 502b using the continuous-wave argon ion laser beam, Yamazaki '080 describes, at col. 5, lines 27-35, using an excimer laser to form a first region 502a:

The laminate was ... irradiated with pulsed light emitted by a KrF excimer laser to crystallize the laminate. The energy density per pulse was 10 to 500 mJ/cm², e.g., 100 mJ/cm². The wavelength was 284 nm, and the pulse duration was 100 ns. In this way, a polycrystalline layer 502a was derived.

Thus, these passages in no way describe or suggest using the same laser beam, with different pulse durations or otherwise, to form two crystalline regions.

At paragraph (2) of the response to argument, the Examiner indicates that Yamazaki suggested that the two crystalline regions be formed using the same laser beam (YAG laser) at col. 4, lines 50-68 and col. 5, lines 1-5. As best understood, this argument appears to be relying on the statement in Yamazaki at col. 4, lines 55-57:

“Where laser annealing is utilized, different wavelengths of laser irradiation are used, or different pulse duration of pulsed laser are used.”

While this statement, taken out of context, does not bar the use of the same laser beam, it certainly does not describe the use of the same laser beam. Moreover, when considered in the context of the examples of the Yamazaki '080 patent, which, as noted above, use different laser beams, it also does not suggest the use of the same laser beam. Accordingly, for at least these reasons, appellant respectfully disagrees with the position expressed in this paragraph of the Examiner's Answer.

Paragraph (3) of the response to argument appears to be a mere reassertion of arguments previously presented by the Examiner. Responses to those arguments were provided in appellant's Appeal Brief.

Paragraphs (4) to (6) do not appear to raise issues that require further discussion.

For these reasons, and the reasons stated in the Appeal Brief, Applicant submits that the final rejection should be reversed.


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Respectfully submitted,

Date: _____

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